

## PATENT SPECIFICATION

Application Date : Feb. 24, 1931. No. 5764/31. 375,342

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## PROVISIONAL SPECIFICATION

## Improvements relating to the Making of Bread.

We, THE BRITISH ARKADY COMPANY LIMITED, a British Company, of Skerton Road, Old Trafford, Manchester, and HARRY HEWITT, a British Subject, of the same address, do hereby declare the nature of this invention to be as follows:—

In the making of fermented bread, it is usual to allow the dough to stand for a period after mixing in order that fermentation may take place. The two chief results of fermentation are firstly, a production of gas which aerates the dough, and secondly a softening or maturing of the dough, as a result of which the dough stretches more easily under the expansive force of the gas generated. The maturing or softening of the dough is directly due to action upon the gluten contained in the dough. As a general rule, the dough is allowed to rise until it has attained about twice the original bulk which is due to a slow rate of gas generation, the dough being then punched or cut back to release the gas and incorporate a certain amount of air into the dough. The fermentation is allowed to continue until the dough is sufficiently matured and the fermentation is sufficiently rapid. It is sometimes found necessary to punch or cut back the dough twice or three times in order to obtain this result. This extension of the fermentation time results in an increased loss of fermentable ingredients. The time required to obtain a sufficient rate of gas production may be reduced by increasing the quantity of yeast used, and the use of such excess of yeast is frequently resorted to in order to speed up early morning baking but the maturing of the dough is not accelerated by this means to the same extent as the rate of gas production and the loss of fermentable substance remains approximately the same.

The object of our present invention is to produce an improved bread more rapidly and with less fermentation losses than at present usual.

A further object of the invention is to restore the balance between gas production and gluten maturing in short doughs and therefore permit the use of stronger flours than can at present be used successfully in short processes of breadmaking.

[Price 1/-]

Our invention comprises the production of bread from a dough batch incorporating a gluten softening agent, the length of the fermentation process being reduced below what is now usual with the normal yeast fermentation process. 55

Our invention further comprises the expediting of the softening of the gluten of a dough batch and the reduction of the fermentation period by the incorporation in the mixture for the dough batch of papain of the papaya plant. Papain is manufactured in various strengths, and the amount of papain to be added to the dough batch or the ingredients thereof varies according to the strength of the papain and the strength of the flour. We may add up to one ounce of papain of a strength designated 1:200 to 280 lbs. of flour and the remaining ingredients of the dough batch with the result that the dough will be matured in a much shorter time. If papain of a higher or lower strength is used, the amount can be proportionately reduced or increased. 60 65 70 75

We may also add to the dough batch salts which are known to have a stimulating or accelerating action on the rate of gas production by yeast, and particularly those salts which have their main effect in the later stages of fermentation. Of these the ammonium salts are the best known, and by the use of ammonium salts such as ammonium chloride together with a gluten softening agent as above described, the time for fermentation may be considerably reduced, and the fermentation losses also reduced, whilst the dough is sufficiently matured and attains a sufficient rate of gas production to give loaves of good texture and good appearance. 80 85 90 95

As an example, if to a dough batch comprising 280 lbs of English milled flour of average strength, 155 lbs. of water, 4 lbs. of salt, and 2 lbs. of yeast, we add  $\frac{1}{2}$  oz. of Papain of strength designated 1:200, the time required for the gluten to be sufficiently matured is reduced from about 4 hours to 2 to 2½ hours. 100

Dated this 19th day of February, 1931.

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## COMPLETE SPECIFICATION

## Improvements relating to the Making of Bread.

We, THE BRITISH ARKADY COMPANY LIMITED, a British Company, of Skerton Road, Old Trafford, Manchester, and HARRY HEWITT, a British Subject, of the same address, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

In the making of fermented bread, it is usual to allow the dough to stand for a period after mixing in order that fermentation may take place. The two chief results of fermentation are firstly, a production of gas which aerates the dough, and secondly a softening or maturing of the dough, as a result of which the dough stretches more easily under the expansive force of the gas generated. The maturing or softening of the dough is directly due to action upon the gluten contained in the dough. As a general rule, the dough is allowed to rise until it has attained about twice the original bulk which is due to a slow rate of gas generation, the dough being then punched or cut back to release the gas and incorporate a certain amount of air into the dough. The fermentation is allowed to continue until the dough is sufficiently matured and the fermentation is sufficiently rapid. It is sometimes found necessary to punch or cut back the dough twice or three times in order to obtain this result. This extension of the fermentation time results in an increased loss of fermentable ingredients. The time required to obtain a sufficient rate of gas production may be reduced by increasing the quantity of yeast used, and the use of such excess of yeast is frequently resorted to in order to speed up early morning baking, but the maturing of the dough is not accelerated by this means to the same extent as the rate of gas production and the loss of fermentable substance remains approximately the same.

The object of our present invention is to produce an improved bread more rapidly and with less fermentation losses than at present usual.

A further object of the invention is to restore the balance between gas production and gluten maturing in short doughs and therefore permit the use of stronger flours than can at present be used successfully in short processes of breadmaking.

We have found that we can attain the objects of our invention if we add papain

to the dough batch or any of the ingredients thereof without further additions, though in some cases we may add an ammonium salt also.

Our invention comprises the production of bread from a dough batch incorporating papain as a gluten softening agent, the length of the fermentation process being reduced below what is now usual with the normal yeast fermentation process.

Papain is manufactured in various strengths, and the amount of papain to be added to the dough batch or the ingredients thereof varies according to the strength of the papain and the strength of the flour. We may add up to one ounce of papain of a strength designated 1:200 to 280 lbs. of flour and the remaining ingredients of the dough batch with the result that the dough will be matured in a much shorter time. If papain of a higher or lower strength is used, the amount can be proportionately reduced or increased.

The expression 1:200 used herein with reference to papain strength indicates that under certain standard conditions the papain in question will digest 200 times its weight of boiled egg white.

We may also add to the dough batch ammonium salts which are known to have a stimulating or accelerating action on the rate of gas production by yeast, and which have their main effect in the later stages of fermentation. By the use of ammonium salts such as ammonium chloride, together with a gluten softening agent as above described, the time of fermentation may be considerably reduced, and the fermentation losses also reduced, whilst the dough is sufficiently matured and attains a sufficient rate of gas production to give loaves of good texture and good appearance.

As an example, if to a dough batch comprising 280 lbs of English milled flour of average strength, 155 lbs. of water, 4 lbs. of salt and 2 lbs. of yeast or to any of the ingredients producing this dough batch, we add  $\frac{1}{4}$ th of an ounce of Papain of strength designated 1:200, the time required for the gluten to be sufficiently matured is reduced from about 4 hours to 2 to 2 $\frac{1}{2}$  hours. In cases where the rate of gas production with the said dough composition is not sufficient to yield a well built loaf, we may add 2 oz. of ammonium chloride which will overcome this defect.

It will be understood that the extent of

proteolysis set up by the papain in order to soften the gluten according to the invention, is only very slight in comparison with the extent of proteolysis which must be reached, for instance, in order to render the protein soluble in water.

We are aware of Specifications Nos. 340,072 and 17,782/1898 and do not claim anything claimed or described therein.

10 Having now particularly described and ascertained the nature of our said inven-

tion and in what manner the same is to be performed, we declare that what we claim is:—

In the making of bread, the incorporation of the dough batch or any of the ingredients thereof, of papain as a gluten softening agent with or without the addition of an ammonium salt. 15 20

Dated this 18th day of November, 1931.

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[Wt. 8138.—50/8/1939.]

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